No Guts -

FORWARD

Since Major General Frederick Blesse's No Guts No Glory was first authored by the then Major Blesse, it has been a much desired item. Originally it was sought after because it was the only available "how to" text on ACM. Lately its appeal lies in its valuable historical and "fighter lore" aspects. The Fighter Weapons Review has been unable to keep up with the demands for this document. Therefore, we are pleased to present this reprinting of General Blesse's classic, "No Guts No Glory".

The Fighter Weapons School has made brief comments where appropriate. These comments appear as Notes and in a bolder typeface. No attempt was made to extensively update or revise the original text. To do so would have presented difficult classification problems. It is important to note that the tactics and formations described in the original text apply mainly to F-86 versus MIG 15 aerial combat. It is our desire that this reprinting be read as a historical document. TAC's current tactics, techniques, and formations are extensively presented in the classified AFM 3-1 and the Fighter Weapons School's Aerial Attack Texts 111507D PART TWO, Volume One (Confidential) and PART TWO, Volume Two (Secret). Many things have changed; some have not. It is our hope that No Guts No Glory will be read with interest and enjoyment -- enough of each to instill the desire to dig into the voluminous, yet important, current information that is available on the subject of Air Combat. Interest, discussion, commentary, and study are the first important steps in understanding and applying air combat tactics as they exist today.

No Glory

Preface

Before getting into a full scale discussion on tactics, let us look at our overall aim in attempting to record information of this kind. The inevitable question as to whether it is worthwhile, since many, many pilots never get a chance to use the knowledge, is bound to come up. This fact is acknowledged, but still a strong program of teaching air-to-air tactics is a necessity if our Air Force is to remain the most aggressive air arm in the world.

One of the *minor* contributions which instruction of this type makes to the pilot is the ability to fly on another man's wing through any kind of maneuver his leader attempts. The greatest reward and the basis for all that is to follow, however, is the self-confidence the pilot feels in himself. As this confidence grows, so does his enthusiasm. Enthusiasm increases interest, which in turn pays dividends in overall accomplishment. All of these qualities together add up to the one thing a training program must produce if the graduate pilots are to be successful in combat – aggressiveness. It is this pilot aggressiveness which we seek. Without it, all training is useless, for the individual pilot must have the desire to put into effect that which he has been taught. Amazing results have been achieved in combat through aggressiveness alone, but it has been proven time and again that all the training in the world is insufficient when the individual does not have it in his heart to engage the enemy or destroy the target. Certainly then, the goal which we seek, or should be seeking, in the training of any pilot is to produce a pilot who is aggressive *and* well trained. I should like to feel that the methods described herein will contribute to his training and help him to acquire this golden quality of aggressiveness. If such proves to be the case, our time will have been well spent.

I would like to add one more thought. Although recorded by a single person, the following information is certainly not the product of any one individual. This is really a story.....a story of patience, anxiety, frustration, death, sorrow, and a thousand other descriptive words known only to those who day after day fought their way into Mig Alley and back, and experienced these things for themselves. Each pilot learned something. Some learned how to fly; some learned how to kill; some learned to bear the sorrow of losing a good buddy; some learned how to be a man. Each contributed something. Some who gave information were the finest caliber of fighter pilot our country will ever see. Some few we were not too proud of but all had a part.

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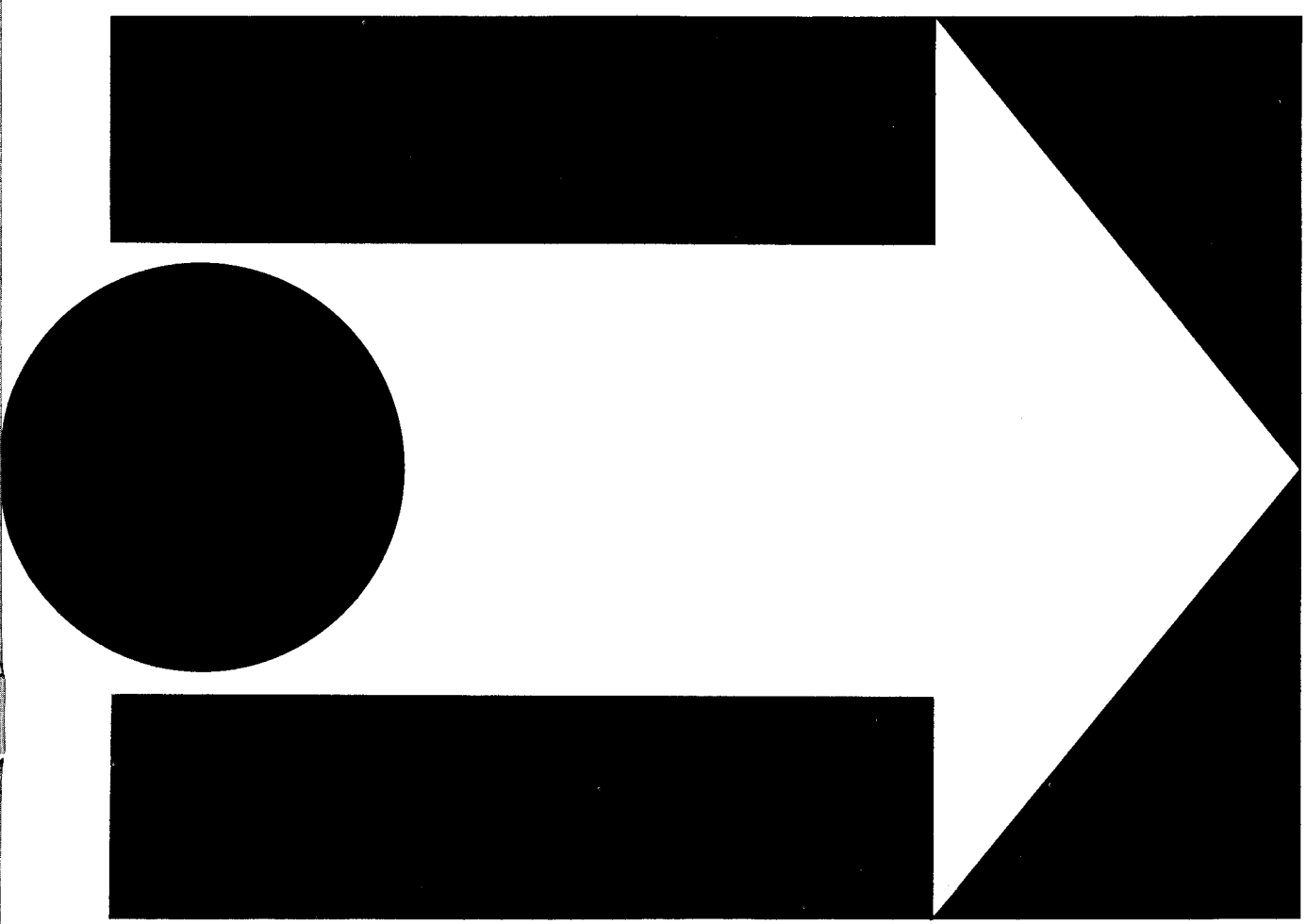
SECTION 1

the OFFENSIVE



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OBJECTIVES OF TACTICAL FORMATION

There are several fundamental reasons for the existence of tactical formation which should be constantly kept in mind and repeatedly emphasized to the pilots during instruction. A thorough understanding of the reasons for the employment of Tactical Formation is necessary before a pilot can attain any degree of proficiency. Short-sighted or misplaced objectives must be replaced, in his mind, by realistic objectives and by sensible approaches to the means of realizing these objectives. Tactical Formation is employed to achieve the following broad objectives:

1. To achieve maximum maneuverability for offensive air-to-air operations (Offensive Tactical Formation).

2. To achieve maximum mutual support and visual cross-cover for defensive air-to-air operations (Defensive Tactical Formation).

3. To assign definite responsibilities to each member of the flight and provide a chain of consecutive command authority in order to maintain unity within the flight throughout the mission regardless of any unforeseen difficulties.

4. To enable each member of the flight to perform cruise control consistent with the requirements of the mission and to accomplish his own navigation in addition to fulfilling the duties required from all members of an effective combat team.

Practically all Tactical Formations are a compromise between maximum maneuverability and maximum mutual support, and the extent of the compromise depends upon the requirements of the mission to be flown. A pilot who has these objectives firmly fixed in his mind and who governs his Tactical Formation flying with a constant awareness of these broad objectives will be able to master the complexities of Tactical Formation much sooner. If we can get a pilot to gain proficiency in a basic form of Tactical Formation which incorporates all the important principles involved, then it is a relatively simple matter for him later to convert to a more specialized variation designed to meet the particular need of some Theater, Air Force, Wing, or Group Commander. There are two basic types of Tactical Formation, Defensive and Offensive. Since we shall always be on the offensive unless forced to be otherwise, let us first consider the Offensive Tactical Formation.

OFFENSIVE TACTICAL FORMATION

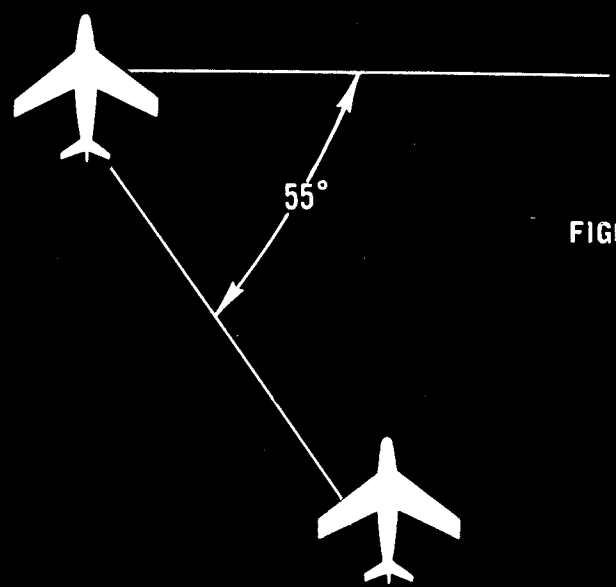
In any discussion of the air tactics problem, one must of necessity deal with a fairly experienced fighter pilot, for it takes a good bit of experience to be able to interpret and absorb information of this kind. It becomes apparent then that we must start somewhere to give the inexperienced pilot some instruction if we wish him later on to become a good combat leader capable of carrying the fight aggressively to the enemy. In order to accomplish this ultimate aim, a thorough understanding of certain responsibilities is mandatory, not only as to how they should be accomplished, but also as to why.

Let us start with the most elementary of the basic problems -- the position of the wingman on a typical mission where enemy fighter opposition is expected. There are just about as many positions taught in our Air Force as there are fighter pilots. In spite of this, it should be evident that some one position must offer more advantages than the others. What is it we want from the wingman? We want him to do two things: (1) fly his aircraft in such a way that regardless of the leader's maneuvers, he will not become separated and (2) look around. If item (1) is not put first in his duties, he obviously will not perform his primary purpose in being there, that of supplying the eyes to the rear for the lead aircraft. We see then that, unless the wingman can get flexibility and maneuverability in the position he flies, he is in constant danger of being separated, especially when the element or flight is attacking or under attack. He must be able to look around. Through experience in Korea, we found the position best adapted to meet these two important requirements was:

1. For patrolling, have the wingman fly about 35 degrees back and out only as far as he can still read the large numbers on the side of his leader's aircraft. This is as far forward and as far out as the wingman should ever get unless lack of fuel or some other circumstance renders the element useless offensively.

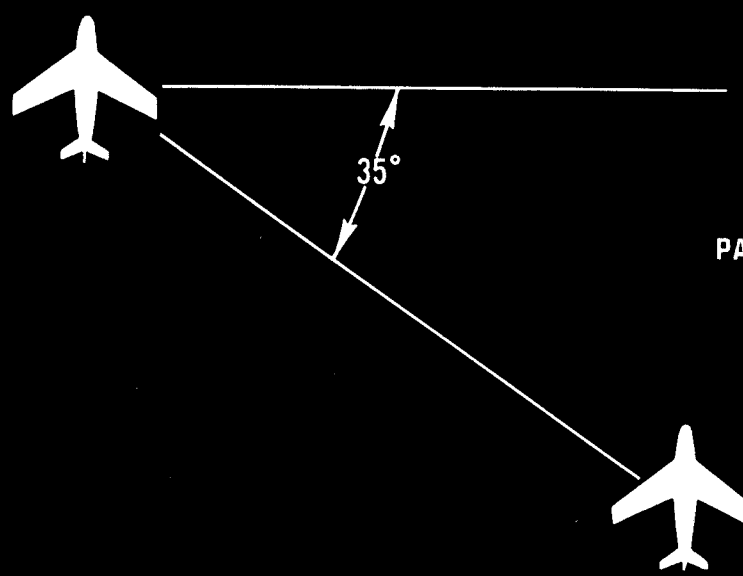
2. When enemy aircraft are sighted, the wingman moves into a *fighting* position. (He does not move in along the 35-degree angle line, but along a line perpendicular to the flight path of his leader's aircraft.)

In the fighting position, the wingman will probably be able to read the small numbers on the vertical stabilizer and will be back from his leader about 55 degrees. These are only crutches for the beginner to use. He actually flies, not in a position, but in an area - cutting off, crossing, sliding to trail, doing what's necessary to stay with his leader. Now it only takes a moment for one to



FIGHTING FORMATION

THE DISTANCE BETWEEN AIRCRAFT IS SUCH THAT THE WINGMAN CAN PLAINLY READ THE SMALL NUMBERS ON THE VERTICAL STABILIZER OF THE LEADER'S AIRCRAFT.



PATROL FORMATION

THE DISTANCE BETWEEN AIRCRAFT IS SUCH THAT THE WINGMAN CAN JUST BARELY READ THE LARGE NUMBERS ON THE FUSELAGE OF THE LEADER'S AIRCRAFT.

realize that this is pretty close to the leader, but that is what is needed in an aerial fight. The wingman must be close enough to his leader to make it necessary for an enemy aircraft to actually out-perform and out-maneuver the leader himself in order to shoot down the wingman. Just one ride in this proper position will be a little discouraging to the average pilot for, during the early state of training, not much time can be spared for looking around.

When one first learns to drive a car, it is safer to learn outside the city for it takes all of one's concentration just learning to coordinate clutch, gearshift, accelerator, and brake. Later though, we find the driver downtown doing these things and, in addition, watching traffic signals, persons crossing the street, street cars, and other obstructions to traffic. He has become so familiar with the car that its mere operation is second nature and most of the time formerly spent shifting gears is now devoted to "looking around". This same transition takes place with the wingman. He must be required at first to learn where to put his aircraft during maximum performance in order to stay with his leader, whether he can look around or not. All the performance the aircraft has in it is not enough if the wingman does not put his aircraft in a position to utilize this performance. Later, as the job becomes progressively easier, the wingman will find more and more time left over which he naturally devotes to looking around.

A few tips for the wingman now before we leave this subject. Consider your fuselage in relation to your leader's fuselage when maintaining position. Keep your fuselage stacked just slightly down at all times on your leader. When turned into, resist the temptation to drop way down with your wings in the same plane as your leader. Drop down a few feet, perhaps, but then hold what you have and see what happens. If you have trouble seeing the leader, or if you begin creeping forward (as you may when he tightens up his turn), ease off your bank and slide toward the trail position. Since you have no idea (and neither does the leader, actually) just how far around the leader is going, stay five or six ship lengths from him in trail, if necessary, and hang on 'til he eases off on the G's. At low altitudes, stay on the inside of the turn whenever possible. Cross or slide toward trail position when G forces make it necessary - but, *not until*. Remember this: You'll know when it's time to go to trail because you can't go anywhere else. There will be too many G's and no visibility on the inside of the turn, and you will immediately be left behind on the outside. That only leaves this "maximum performance cone" to which to slide.

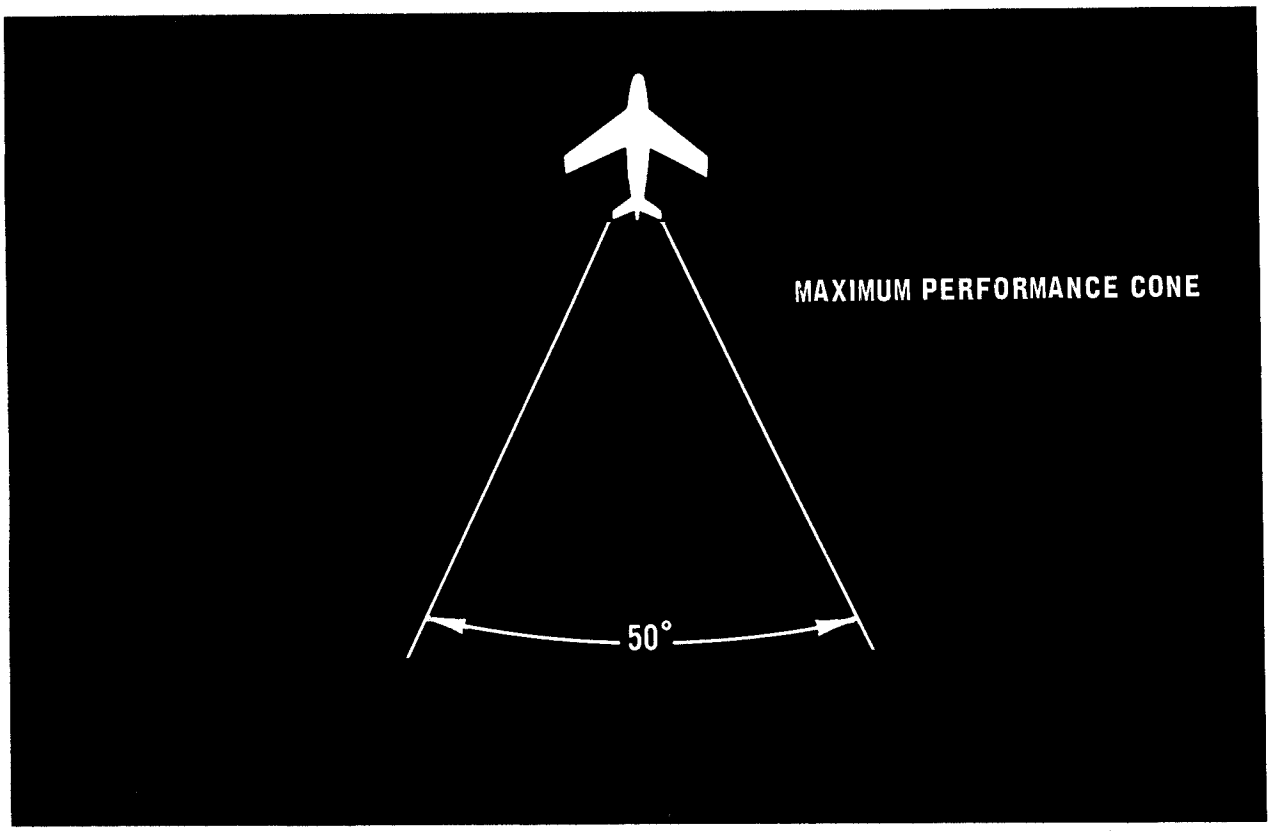
During the initial encounter when the leader is maneuvering with an aggressive enemy pilot, it will be difficult for the wingman to do anything but hang on. During the maximum performance stage, as was stated above, hang on until the leader is no longer pulling maximum G's, then immediately get to the inside of the turn and begin looking around again. Tell the leader what you see every time you are able to take a look. If you should become separated from your leader, give him a call immediately after being separated. If you are unsure of your location, tell him that immediately. Head for the pre-arranged rendezvous point, keeping Mach high and clearing yourself constantly.

While you are a wingman, think as a wingman and play on the team. When you get to your Tactical Organization, you will find that being the best wingman in the Squadron is the quickest way to become an element leader!

HIGH ALTITUDE FORMATION FLYING

As you may have noticed, high altitude formation work was carefully avoided in the preceding section. I think it is important enough to be dealt with separately. High altitude means that altitude where you are beginning to lose the effect of your thrust and turning ability to the extent that maneuverability becomes a problem to you.

You can get away with the technique of throttle changing on the inside of turns at low altitudes. Down low, your throttle gives you quick reaction; at high altitudes, however, you will be left behind after your leader rolls out of a turn that is into you. For this reason, a little different technique is required when flying at very high altitudes. As you increase altitude, the common conception is that you must spread further out. Nothing could be further from the truth. The higher you go, the less effect your thrust has on the aircraft; thus the time to move from one relative position on your leader to another is greatly increased. If it takes longer to get from patrol position to the fighting position at altitude, then the logical answer certainly is not to move further out and exaggerate your problem. Actually, the same formation you have used at lower altitudes will hold you in good stead, but even then your time to get to a fighting position will be increased. To cut this down you would have to go so close to your leader that you would spend too much time actually flying formation. Besides this, you can afford this extra little time required because your attacker will be longer in his curve of pursuit or attack; his performance



is cut also. (**NOTE: Because of today's expanded enemy missile capability, the spread of our fluid four or tactical patrol formations must increase as altitude increases. Increased lethal range makes early acquisition of the enemy aircraft or weapon absolutely essential.**)

Some things then that will help the wingman maintain his position on his leader are:

1. Use about the same distance from your leader that you did at low altitude.

2. As a wingman, do not attempt to stay on the inside of the turn the way you did at low altitudes. Concentrate on keeping your airspeed the same as your leaders. This means:

3. When turned into, ease across from inside to outside behind your leader. Change gradually as you gain. Once on the outside, slowly change sides again as he pulls away from you.

4. As an element leader using fluid element, gain a little altitude as you are turned into and rarely get more than a hair to the outside of the turn. As the turn is completed, drop on down to your normal position, trading the altitude you

5. As a wingman, make all your stick movements gentle pressures or you will lose valuable airspeed by buffetting or stalling the aircraft.

6. As a flight leader, make gentle turns with your flight to preserve the Mach you have.

7. Watch tailpipe temperature; it increases quickly and will even go above limits at extreme altitudes and decreased Machs. (**NOTE: Tailpipe temperature does not apply in the F-4.**)

8. Use your oxygen system properly and get to lower altitudes if you have any reason to suspect trouble.

9. Be more attentive to keeping your approximate position while you are flying wing. Once you get out of position at high altitude, it's going to take you a long time to get back.

10. Cruising at high Mach is imperative for high altitude work. A low airspeed at low altitude is a bad practice but at least the aircraft will still turn and maneuver. This is not true at high altitude.

11. The percentage of kills per sighting will drop off at high altitudes. Everything is too critical - no room for misjudgment.

THE ELEMENT

While you are striving to be the best wingman in your squadron, keep one eye on the element leader, for if you succeed, you will soon be faced with his problems. Know the job ahead whenever possible; it will pay big dividends. In that regard, here are a few things about the second element that may help. The second element may be flown lower or higher than the lead element, depending on the individual likes and dislikes of the Unit Commander. The Fluid Four (High Element) is suggested as the better of the two because of its maneuverability and flexibility at all altitudes.

Low Element

The use of the element low is better at low altitudes where you have lots of thrust and performance; however, let's see what we have when the element is down on a level or slightly below the lead element. With the element low it will have to be back about 35 degrees at least in order to allow the lead element the maneuverability necessary for maximum performance in offensive action. Even though it is back that far, mutual support from the lead element can be obtained easily, regardless of the type of turn the element leader uses when turning into his attackers.

The lead element is equally effective defensively with the second breaking away and down, away and level, or away and up. However, if the *lead* element is attacked with the second element low, the situation is not so clear-cut nor is mutual support so easily accomplished. The elements are about the same airspeed, with no possibility of a material change. (Even if afterburner were available, the lead element would probably cut it in when attack was discovered and cut down any possible chance for the second element to close for mutual support.)

Thus we see that the lead element, although out in front, is not as well protected as the second element unless, of course, he chooses to break off his own attack. Obviously, this is undesirable. This is why we recommend for any altitude the "fluid four" or high position for the second element. Here the element can dive to overtake any attacker of the lead element, and can furnish support in such a manner that it *allows the lead element to complete any attack begun.* This we feel to be the primary mission of the second element. From a low position the element cannot accomplish this purpose. One must keep in mind that the entire purpose behind air superiority aircraft is attack; therefore, you should use a formation that best suits this purpose. If your primary concern is defense, don't go on the mission. (**NOTE: With today's missile capability, the element can be flown low while still providing protection for the lead element.**)

The Highest Element or Fluid Four

The element leader in this type formation is invaluable to the Flight Commander. He must take a position on the lead element that affords him an advantage on any aircraft trying to attack the lead element. His primary purpose is to cause the attacker of the lead element to break off, thus allowing the lead element that period of time necessary for the destruction of the aircraft he is attacking. The element obviously performs other defensive and offensive functions; but with the four-ship flight on the offensive, it must be kept in mind that the primary function of the element is that of allowing the lead element to complete successfully any attack begun. Any split of elements before this function has been performed, unless the second element is attacked, should not be condoned. A good element leader may perform as indicated several times on the mission before getting a kill himself, or only once before a physical split of the elements is necessary. The tactical situation will determine when the split is to be made. The element leader should be encouraged to press his attack if he has a substantial advantage on the attacker of the lead element even though it may require leaving the lead element permanently. Either element may be the lead element, depending on experience level in the flight, direction of attack, position of enemy aircraft, and who sees the enemy first. If time permits, however, the lead element should be directed until visual contact is made, thus allowing the flight to begin the fight with the element properly positioned and with each man performing the job for which he is best trained.

If the high element is attacked, he may dive straight ahead, overtaking the lead element (if he has observed the attack early enough) then turning away from the lead element when the attacker presses close enough to make it necessary. If he should break up and away from the lead element, mutual support will be extremely difficult. If he breaks down and away, the lead element can reach him nicely and mutual support becomes quite simple. Thus we see that here the first element is well protected and, although the second element is not as well protected as if he were low, he is certainly adequately protected if he uses the correct evasive defensive maneuvers. This slight defensive sacrifice for the tremendous offensive capability of having the second element always able to reach the first element quickly, is deemed more than a fair exchange. If you doubt it, which flight would you rather attack - one with both elements at the same level where you can keep track of them

easily, or a flight of four where only two can be see at one time?

For the Fluid Four, element leaders should fly back about 20 degrees and out about 5,000' to 8,000'. (Laterally you should be a little closer to your leader than you are to the tow ship when firing air-to-air gunnery.) Be above your leader 2,500' to 3,500'. *These are estimates.* To find the correct position, place the element up there so he can make a good high side pass on the leader or on someone up to 2,000' behind the leader. In a shallow turn, if you can't immediately tell whether the leader is turning away from you or into you, you are too far away from him. **(NOTE: The Fluid Four or Tactical Patrol Formation now varies with altitude in an attempt to give better coverage in a missile environment.)**

FLIGHT LEADERS

We have discussed both the wingman and element leader of our highly specialized team. Here are a few things for flight leaders to think about. Whether in training or combat, the flight leader has a vast amount of responsibility. In training, he must guide a new pilot gently, but firmly, never exceeding the inexperienced pilot's capabilities, yet reaching as quickly as possible that stage where the wingman may be expected to do the right thing instinctively in combat. In combat, the leader must be able to maneuver one of his two elements into the firing position on the enemy aircraft without unduly jeopardizing other members of the flight. The word, "unduly", can and will be interpreted differently by all flight commanders. Some, because of their ability, may attack twice or three times their number with no more risk involved than another flight commander attacking a single element. A good flight commander must have a complete mastery of his aircraft and must be an accomplished navigator and instrument pilot. He must be able to think alone, possessing the essential ability of being able to assess a combat situation quickly and accurately. *He must be aggressive or all his other capabilities are wasted.* He must know the capabilities of enemy aircraft to be encountered in relation to the performance of his own aircraft. A few things that might help the leader, both in training himself and his flight for combat, are listed below:

1. BEFORE TAKE-OFF: Be certain every man knows his job before he gets in his aircraft. Make your briefings thorough. Brief so you cannot be misunderstood.

2. TAKE-OFF AND JOIN-UP: If you have a man taking off on your wing, don't use more than 97% for take-off. For a straight away climb out, begin your climb at a fairly high airspeed and climb normally from that time on. Have the element begin a climb about 30 knots above your speed, then judge the rate of climb on the lead element. He will soon overtake you, even though you have not throttled back below 97% since take-off. The element should not attempt to join up in close formation but, instead, use the overtaking speed to bring the second element into the "Fluid Four" element position. **(NOTE: These take-off and join-up power settings do not apply for the F-4.)**

3. CLIMB OUT: If there is any possibility of meeting other aircraft during climb out, climb at higher than Tech Order airspeeds. Increase your climbing Mach as altitude increases. If you are climbing straight out, the element leader should be looking into the sun and the number 2 and number 4 men would naturally be on the outside of the formation. During climb out, ease your power up and try to get some idea about the speed of all the aircraft in your flight. As you increase power, note the percent at which the slowest first begins dropping behind and then give him about 2% to play with for the rest of the mission. You'll find having him with you when the fight starts will more than make up for that 2% of the power.

4. CRUISE:

a. Cruise at a high Mach and you'll find you have an advantage on most enemy aircraft engaged. **(NOTE: With supersonic aircraft now in the enemy's inventory, cruising at a high Mach does not necessarily mean you will have an advantage over enemy aircraft.)**

b. Steep turns when you are merely patrolling, only force the members of your flight to use excessive power after a new course has been established. During a good, smooth, gentle turn, airspeeds will stay up and flight members can look around.

c. Find the con level. When possible, cruise with your high element just below con level and you'll quickly see any attack made on your flight from above.

5. SIMULATED COMBAT:

a. If your Mach is high when you sight the "enemy", you will be in pretty fair shape.

b. Always turn to meet the attack whether you are element leader or flight leader. If you are an element leader, let your leader know where you are and what you are doing. While you are turning into him, trade your airspeed for altitude. This will shorten your radius of turn, allowing you to get further around toward the six o'clock position on the "enemy". The altitude may also be useful,

depending on what the "enemy" does with his aircraft. Never use speed brakes during the initial maneuvering phase unless you have worked your way at least to the four or five o'clock position. Keep your eyes open and occasionally remind your wingman to look around. **(NOTE: In the F-4 you cannot afford to slow down in an engagement with any enemy aircraft below your cornering velocity.)**

c. Always designate a rendezvous point. If your wingman should become separated from you, stop fighting and get back together. Find out immediately what kind of shape he is in and if he knows his direction home or to the rendezvous point. He should be briefed to proceed to the rendezvous point at high Mach. Get your element together and get back into the fight. In combat as a single, it's generally best to keep your Mach up as high as possible and leave the area completely (clearing your tail every 10 or 15 seconds as you do so).

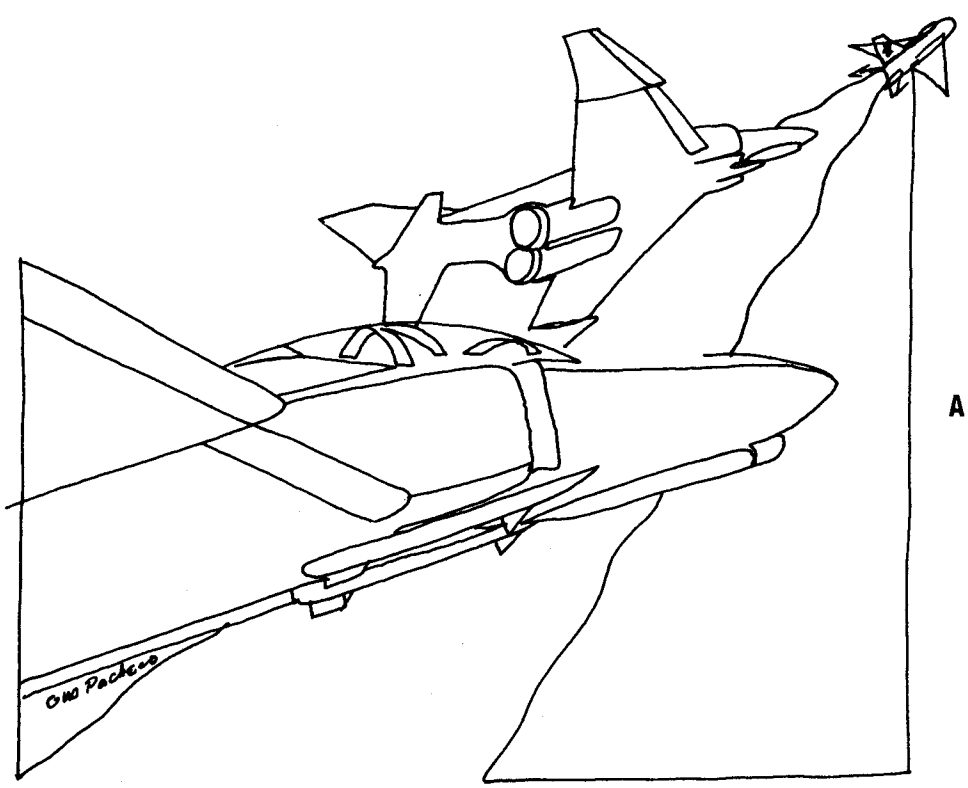
d. Generally when you slow down to maneuver with an aircraft, have your element high and fast to give you top cover. This is especially true in combat around airfields where landing enemy aircraft usually have a CAP flight airborne to fight off attackers.

e. Make sure that your wingmen look around. As the leader, your eyes will have to be out in front of the flight looking for something to attack about 80% of the time. You must be able to depend on your wingmen to do most of the defensive looking.

f. Keep the aircraft you are attacking in sight. Once you spot him, you can't take your eyes from him for one second or you'll come back as one of the many who had him cold and let him slip away.

g. When attacking, *never* get in between the leader and his number two man. This is true in combat, as well as in training, but the result in combat is more obvious. Cutting in between the leader and his wingman during training is the most inexcusable error a leader can make and one that cannot be condoned. A strong sense of responsibility and mature judgment on the part of the leader must prevail at all times if an inexperienced pilot is going to benefit from his flight.

h. Check fuel carefully and often during the encounter. Inexperienced pilots and combat-wise pilots alike are very often forgetful when dog fighting and it's up to the leader to assemble the



A GOOD WINGMAN NEVER LOSES HIS LEADER!

flight and bring it home so as to hit initial with ample fuel remaining in the lowest aircraft.

i. Try to operate your flight just as you would in combat, never forgetting, however, that you can only fly on the par with the weakest man in the flight.

j. In training, you must avoid these flight leader versus flight leader duels. You are not in front to impress anybody. You are out there to teach them. If you should get a man behind you, avoid "pride maneuvers". Pulling the aircraft straight up and then kicking it off into a semi-spin, or dropping gear or flaps, and other such senseless maneuvers would all get you shot down instantly in combat. There is also a good possibility of spinning a pilot of lesser ability into the ground.

COMBAT TACTICS

We have seen the problems involved in actually flying the individual positions. Now let's take a look at the four pilots working as a team. What they do as a Unit is generally classified under the heading of tactics. No one can tell another what to do in a *future* air-to-air fight. We can only relate what we have done that worked effectively a good percentage of the time in the past, and hope that these basic sets of circumstances aid by forming a general background of knowledge from which you can draw instinctively when the chips are down. In this game, there is a great demand for the individual who can "play by ear".

Offensive Tactics

In the following cases, let us assume we can attack, i.e., have airspeed or altitude and are the aggressors.

1. ONE ATTACKING TWO: Ordinarily, you don't stay around without a wingman, but you can always expect the unusual in combat. You may be a single on your next mission. A single aircraft with a pilot who is aggressive and well trained can tear a two- or four-ship flight to shreds unless every man in the four-ship flight knows his job backwards and forwards - a thing rarely seen. When attacking two aircraft, determine the feasibility of dropping unseen below them and gradually slipping into firing range from low and behind. Assuming this is impossible, begin a normal pass from any angle possible and note closely your overtaking speed. If the two aircraft stay together, drive on in using speed brakes around 2,000' range to cut closing speed to where you can expect to fire a reasonable burst. If they break into you, turn with them as long as possible. If you begin to overshoot, slide high and to the rear still using speed brakes to cut speed. Then, depending on your desires, slide back down at six o'clock or stay high and reconsider. You must decide on the way in, whether you are going to slow down and attempt to get at six o'clock at their airspeed or just bounce and pull up. (**NOTE: In the F-4 you must maintain a speed advantage and cannot slow down to an airspeed below yourcornering velocity. The use of speed brakes must be tempered with good judgment.**) How well they are flying, how many enemy aircraft have been sighted in the area, whether you could be picked up if you had to bail out, how much fuel you have in case you make a mistake and have to hit the deck, are just a few of the major considerations before making this decision.

If you slow down, you may get both of them. If you YO YO, you stand a good chance of getting only a few sporadic hits. If you slow down and stay, get the wingman first. If you hit him or for any reason he breaks off, leaving his leader, watch him but let him go and switch to get the leader. The wingman probably will be too excited, especially if he is hit, to think of mutual support and the leader will be easy to get since you are already at six o'clock to him. After you nail the leader, then look again for the crippled wingman. Get him too if you can. If not, get out, keeping your airspeed up. The method of defense and your actions will usually follow a similar pattern. Remember, if properly trained, the one left free will turn back into you so take one and follow him as long as possible; then, at the last moment, change. Many times the one supposedly attacked will commit himself to evasive maneuvers too early, leaving the other a perfect, unprotected target. If this happens, you are fortunate. Let's see what happens if you aren't so fortunate.

As you commit yourself to one, he begins a turn into you, possibly a diving spiral immediately; this generally is a turn away from the other aircraft. Begin the turn with him, but watch the other aircraft carefully just as you did before. If he turns toward you and has timed it properly, he will drop in range behind you. Your only move then is to reverse into him to meet his attack. This can easily end in a scissors maneuver if he is a good, aggressive pilot, so be alert for a possible decrease of throttle and use of speed brakes. He may go right on by, since he has accomplished his purpose of making you leave his partner alone, in which case another reversal to chase him will put you to the rear of both aircraft once again. Now, press your attack on the most likely of the two, for they will probably be separated. Before you fire at one, look behind you for the other.

2. ONE ATTACKING FOUR: Note carefully the position of the second element. Whether they are high or low, attack the second element first. Keep your airspeed up as you close, for you can be sure when he turns into you, his turn will be away from the other element if he can arrange it. Your best chance, therefore, if the element is on the right of the leader, is to attack from the left side. If the element is on the left, attack from the right. This makes it necessary for the second element to break toward the lead element. This will increase your chances for success, for it makes it more difficult for the leader to see what is going on when you are all directly behind and above him. Also, it brings the two elements closer together during the initial phase of your attack, which means you can delay a little longer before committing yourself completely to one element and force them into a defensive maneuver.

When they are out of mutual support position, shift your attack to the lead element and press this attack to the hilt, just as is indicated in the previous discussion of one aircraft attacking two. Look around. After a turn or two, the second element leader may work himself back to where he and his wingman can again help the lead element. If you overshoot, don't commit the foolhardy error of sliding level to the outside of the turn. When you can't back the turn, trade airspeed for altitude and try to keep your aircraft behind his as you are pulling up.

3. TWO ATTACKING TWO: Look around carefully to make certain you are not attacking one of two elements. When you are sure you have really contacted a two-ship flight and not one element of a four-ship flight, begin your attack. You may be high, low, or level but regardless of what you have that enables you to attack, begin the maneuvering phase to put your two to the rear of the two you are attacking. If they don't see you, your job is simple. If they do see you, they will resist your effort to get behind them by a turn into you. This is the beginning of your dogfight.

If their turn is maximum performance, you probably will not be able to turn tight enough to continue closing and tracking at the same time. When you see you can't track, stop trying and either disengage or pull your nose up and to the rear of the two you are attacking. If the situation is such that you cannot slow down to their airspeed, then fire anytime you are in range *and can track;* if not, disengage by breaking down and away opposite their direction of turn. Disengage only if you are in imminent danger of being attacked by slowing down;otherwise, trade airspeed for altitude, keeping to their rear and using throttle and speed brakes as necessary to slide back in at six o'clock.

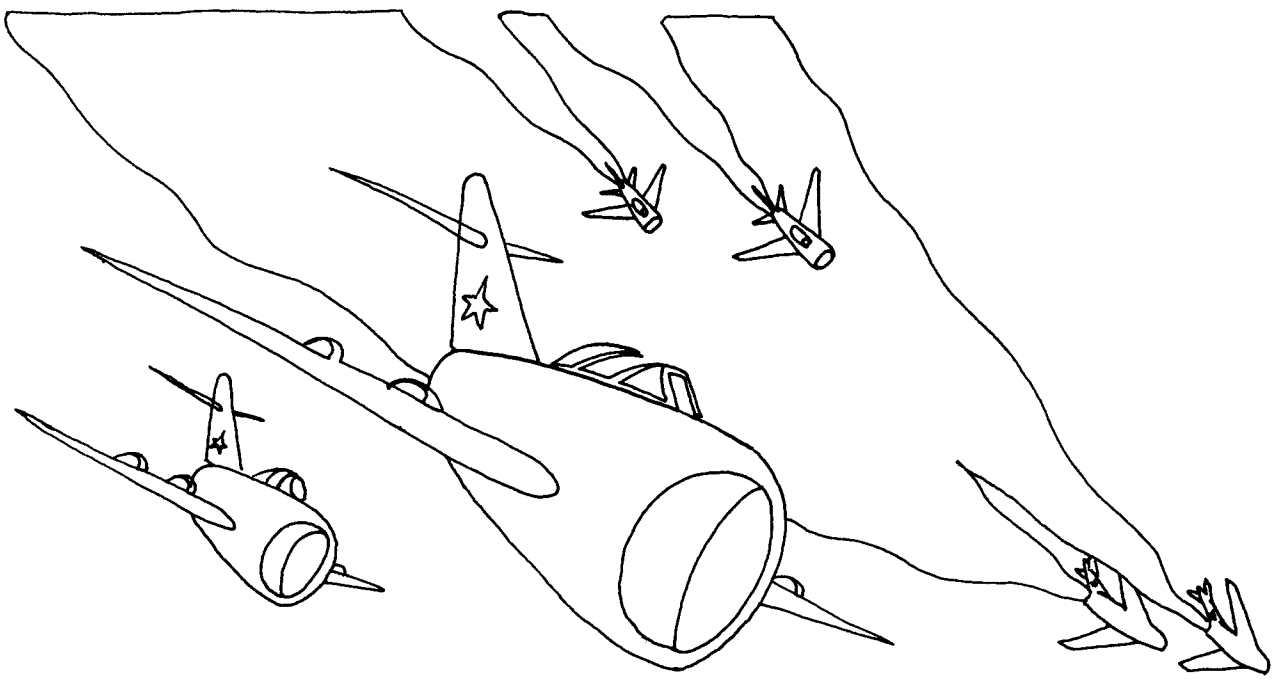
Now watch yourself, for if the two are sharp, they will spread apart, causing you to again make an important decision. Your best move is to do one of two things: (a) Separate with them, each of you taking one aircraft; or (b) Stay together and attempt to make one pilot commit himself defensively to the point where he cannot help the other pilot. At this time, switch your attack and have the wingman watch carefully for the other enemy pilot.

4. TWO ATTACKING FOUR: Begin your attack on the second element and, if possible, from the lead element side. This will cause the element to break behind the leader and make mutual support more difficult between elements. It will bring the elements closer together also and allow you to switch your attack later in your initial pass. To be effective, you must make the second element believe you are really after them; believing this, they will be thinking very little of the lead element. When you switch attacks at the last moment to the lead element, you will generally find the second element is no problem, having gone into a defensive spiral or some such maneuver and become separated from their lead element. If they should come back into you, turn into their attack and disengage before you become entangled with two to one odds and everyone at the same airspeed. If things go right, you'll be two behind two and can continue your attack as described in Number 3 above. But, look around!

5. FOUR ATTACKING FOUR: In a situation such as this, the lead friendly element should attack from the inside of the high enemy second element, or the enemy element farthest back. This is another of the many cases that must be played by ear. As the second enemy element breaks into the attack, they will probably go down so they can get help from the lead enemy element. The lead friendly element switches the attack, if possible, to the lead enemy element in which case the friendly second element stays high and fast and watches for the possible return of the enemy second element. The second friendly element stays as cover until he is needed to run off an attacker or until he becomes the object of the attack himself.

If it is not possible to switch elements when the initial bounce is made, then the lead friendly element will have to decide whether or not he can safely press his attack on the second enemy element. His decision will depend on the position and action of the first enemy element. The second friendly element serves as cover for the first, countering any action taken by the free enemy element. Any time the lead element (friendly) is attacked and the second friendly element has a substantial advantage over the attacker, the second friendly element should be encouraged to exploit

TWO ATTACKING FOUR:
MAKE THE SECOND ELEMENT BELIEVE YOU ARE REALLY AFTER THEM



this advantage even though it requires a permanent separation from the friendly lead element. Sometimes committing both elements to the offensive immediately by putting an interval of 7 to 10 seconds between attacking elements will be productive. The second element is frequently in a position to engage the enemy element attacked as it makes its initial defensive maneuver. By having both enemy elements engaged, you almost cut out the possibility of mutual support between enemy elements.

BASIC PRINCIPLES OF OFFENSE

1. The element of two aircraft is your most effective basic fighting team. When the fight is over, you will be coming home in two's about 90% of the time.

2. Two elements represent your most effective fighting unit - the flight.

3. If enemy aircraft are anywhere in the area, get rid of external tanks as soon as empty.

4. When in doubt in a dogfight, trade airspeed for altitude.

5. Two good aerial training fights a week are minimum number necessary to stay in practice. If you aren't fighting the enemy, practice among yourselves.

6. Never continue turning with another aircraft after you are unable to track him with your sight. Pull up immediately and keep your nose behind his tail. If he pulls up, you'll always end up on top because of your attacking airspeed.

7. If, by using speed brakes, you can drift into the radius of turn of the aircraft you are attacking, do it in preference to the YO YO maneuver. It takes less time to get your kill and you don't run the risk of being out-maneuvered by the aircraft you are attacking. What you are leary about is slowing down and thus subjecting yourself to attack. You are at your opponent's airspeed either way and for less time if you use your speed brakes properly. Obviously, the combat area is no place to experiment with this theory. Don't waste your flying time - practice!

8. Cruise at a high Mach.

9. Look around; you can't shoot anything until you see it.

10. Keep the aircraft you are attacking in sight. One glance away is enough to make you kick yourself for ten years.

11. Generally speaking, have an element high and fast when you slow down to maneuver. If you are trying to snip one up in the traffic pattern, you'll find it difficult at best with all the flak. Don't make the job harder by leaving yourself open for a bounce by the always present enemy CAP flights.

12. Attack from low and behind whenever possible. That's a fighter's porrest visibility area.

13. If you have an enemy aircraft in front, assume there is one behind; there usually is.

14. Know the performance data on all aircraft you are apt to be fighting.

15. Know your "Big Three". Be familiar with glide characteristics, air-start procedures, and fuel consumption at altitude at idle RPM. If you are attacked on the way home, you may need all three to make it back safely.

16. Assume every pilot you meet is the world's best (you can swallow your pride that long) and maneuver your aircraft accordingly until he shows you he is not.

17. Don't shoot unless you're positive it's an enemy aircraft. When it's time to fire, you'll know if it's an enemy aircraft or not. If you can't tell, you are out of range.

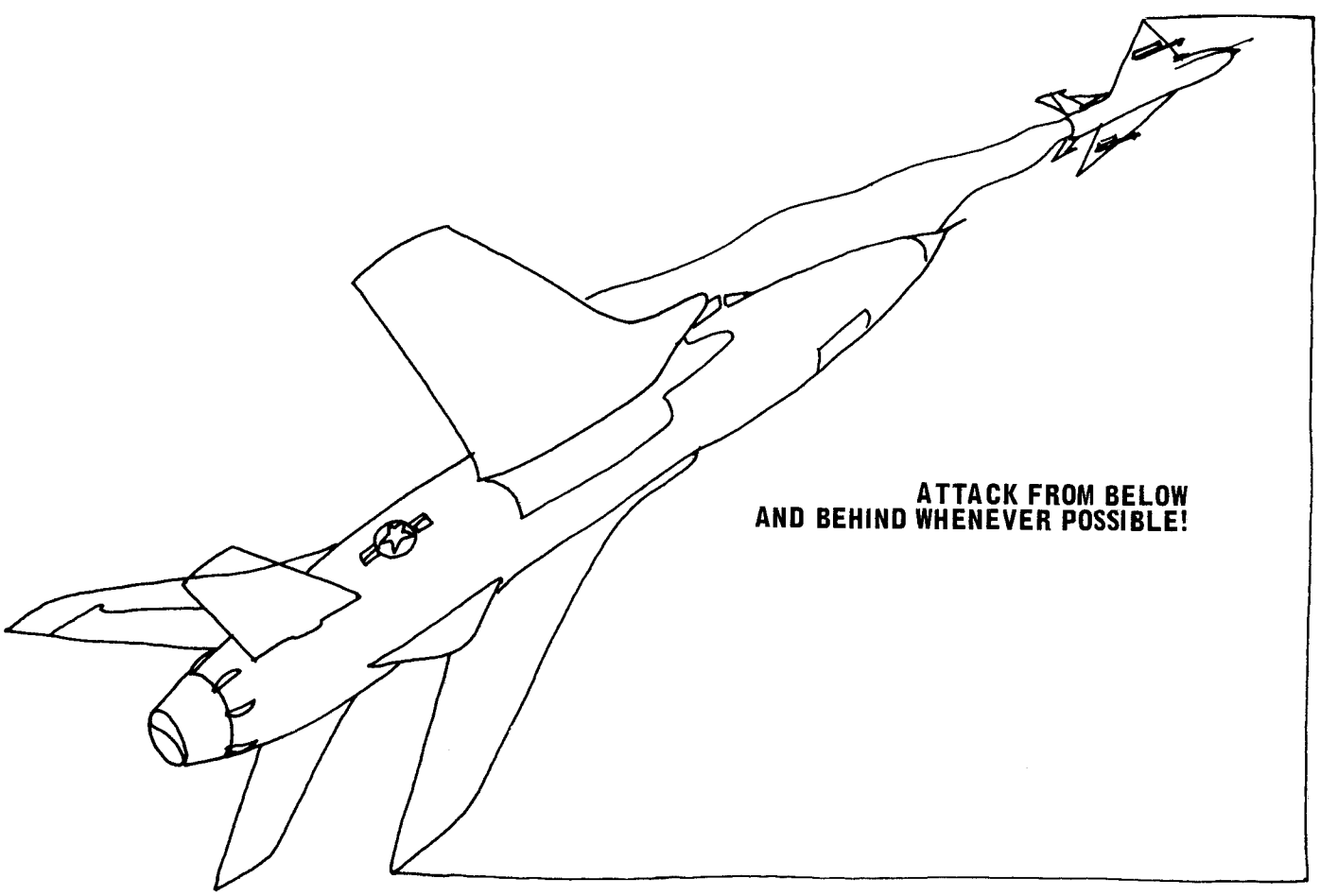
18. There are three distinct phases in destroying another aircraft in the air:

a. Maneuvering - 85%.

b. Positioning the pipper - 10%.

c. Firing and adjusting the burst - 5%. Seventy-five percent of all the lost kills are the result of attempting phase (b) and (c) before phase (a) has been adequately solved.

19. Guts will do for skill but not consistently. Know your job in combat or someone else will be flying in your place.



20. Shut up on the radio; if it doesn't concern everyone, get on another channel.

21. Play on the team - no individualists. The quickest way to be an element leader is to be the best wingman in the Squadron.

22. When in doubt - attack!

23. Learn the value and the proper procedure for harmonization.

24. Divide the enemy and conquer. It is very difficult even for the best pilots to work mutual support tactics in high speed jet aircraft. If you can split the tactical formation of the enemy, more often than not his mutual support efforts against you will be ineffective.

25. One last word before you set out to be the next jet ace - *no guts, no glory.* If you are going to shoot him down, you have to get in there and mix it up with him.

The following poem was written by Wade Daughtrey, the nine-year-old son of seven-year POW, Major Robert Norlan Daughtrey.

If I had my way I'd take my Dad by the hand and
take a long walk with him every single day.
And I'd look up at him and smile every time he said,
"Now son, when I was your age--" But unfortunately--
I don't always have my way.

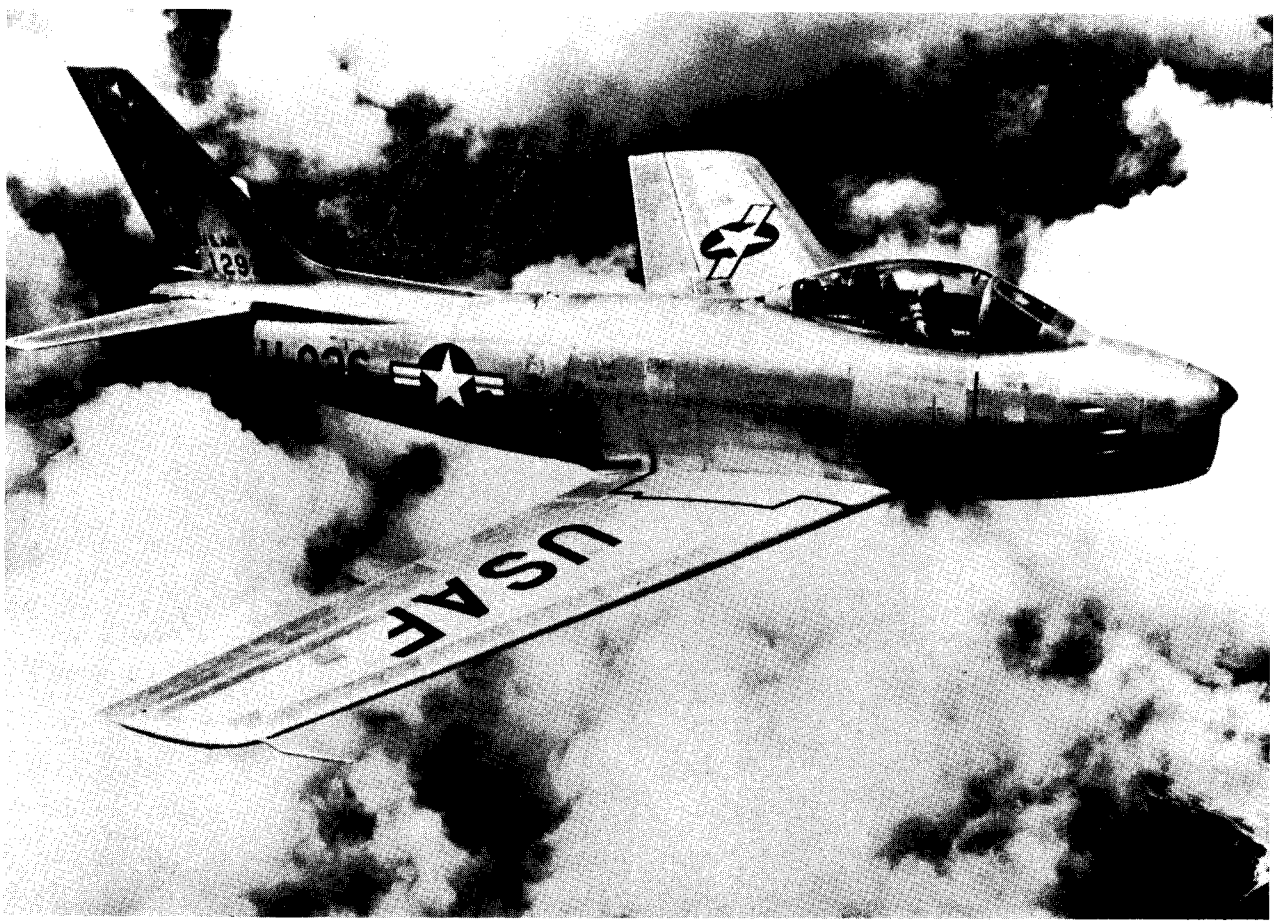
If I had my way I'd run all the way to Hanoi
And run from prison to prison until I found my Dad.
Then I'd take him by the hand and walk and talk and laugh
And smile and pretend I'd had him with me all the while.
But unfortunately-- I don't always have my way.

If I had my way my Dad would still be here like
other kids' Dads. He would help me grow tall and say,
"Son, you're the best kid of all."
But unfortunately-- I don't always have my way.

I don't have my way, nor did my Dad have his way
So I can't see why Hanoi is punishing our family
By not allowing us but one letter this year.
Some families aren't even allowed one letter, I hear.

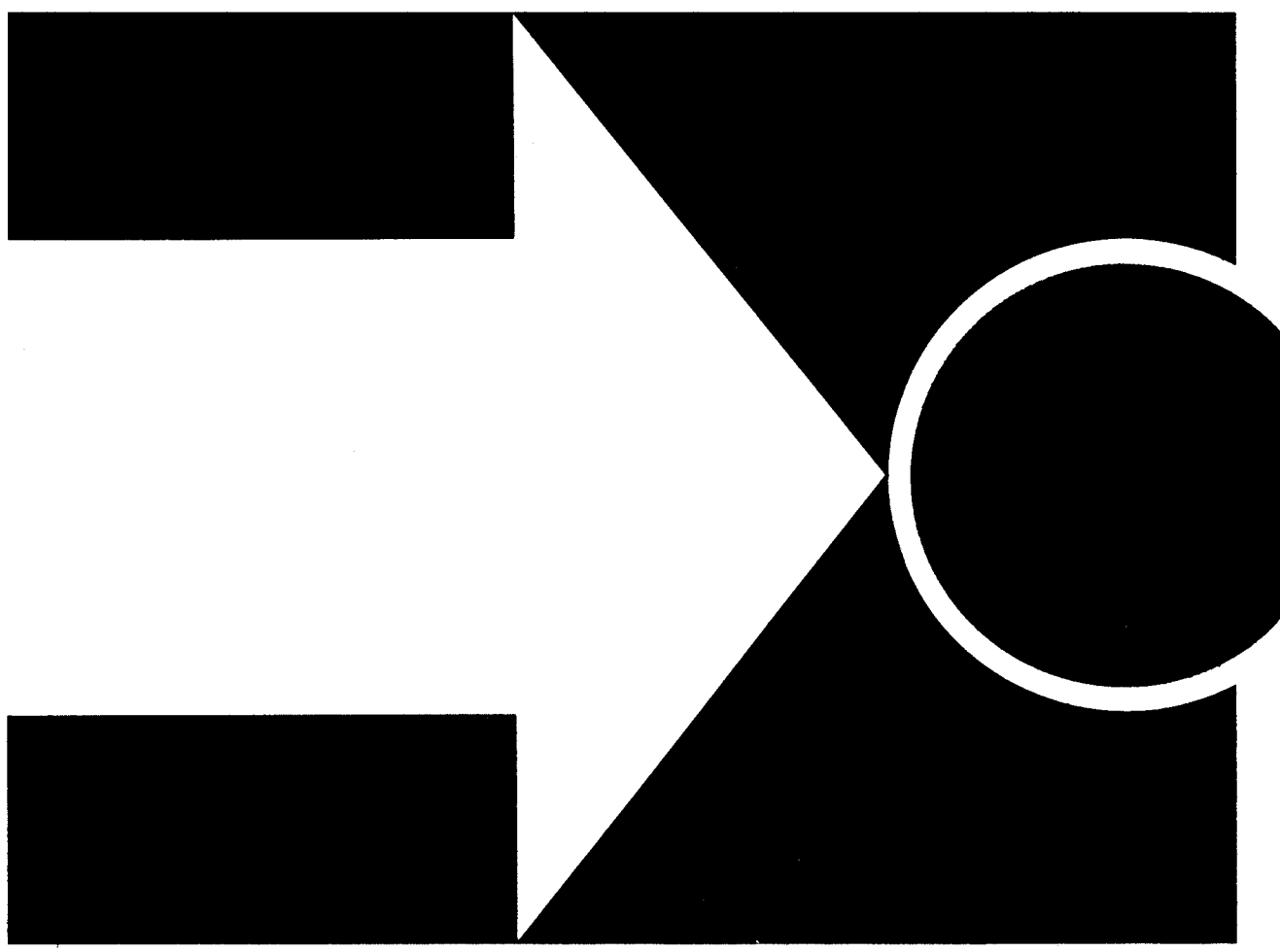
I am only a just-turned nine-year-old boy who loves and
dreams about a Dad I don't really know. Because you see,
It has been seven long years since they took him from me.
But unfortunately-- I don't always have my way.

Wade recently HAD HIS WAY. Major Daughtrey has been released and is now reunited with his family. To Major Daughtrey and all the prisoners of war we extend a rousing WELCOME HOME and a humble THANK YOU. (Reprinted with thanks to the New Mexico Air National Guard.)



SECTION 2

the DEFENSIVE



DEFENSIVE TACTICS

We have been discussing the Offense almost exclusively. We wish we could tell *you* that "a good defense will come naturally" or "a good offense is your best defense." Unfortunately, this is not exactly the case, for no matter how good you are there are going to be times when Lady Luck, if no one else, catches up with you. I doubt if there is a single jet ace who can honestly say that he wasn't just plain lucky to get back on at least one mission. "My wingman lost me and didn't say a damn word"; "there were two other aircraft I didn't see"; "my wingman and I transmitted at the same time and I didn't know they were back there"; "I felt just one more burst would do it", "I didn't think there were any back there"; "I heard him call, 'Break', but I just had to get him"; "I thought the MIG couldn't turn at low altitude"; "for some reason I thought I was *Black* leader and didn't break"; "I saw the long string of 'em but thought I had the last two of the string". These are just a few of the typical comments heard during every debriefing. The line between Ace and POW is a damn thin one at times, not because you aren't good or aren't smart, but because you can't control circumstances. One other reason - let's face it - no matter how good you are, there is another pilot somewhere just a little better.

Defensive Tactical Information

From this we see that in combat there are going to be times when we want maneuverability and flexibility and other times when mutual support is of primary concern. In the instruction of Tactical Formation, therefore, we must consider the probability that both offensive and defensive action will be a necessity and teach our fighter pilots how to handle themselves under either situation.

It seems logical that, when maximum maneuverability is desired, the wingman should be well back and not too wide. By the same token, when mutual support is required, the wingman should get himself well forward and wide enough so that any attacker would have to select either the wingman *or* the leader as his target but not be able to switch his attack once within firing range. This will leave the other aircraft free for mutual support.

It is not meant that this defensive formation be a particularly maneuverable one, except during the first turn. This first turn is the key and should immediately place the attacker in between the two he is attacking if he presses on in. If the attacker pulls off and climbs, the two merely reverse their turn, turning back to the homeward heading. The entire objective is to keep heading home and of course not lose any aircraft. This is the basic defensive plan. Some stereotyped situations are discussed in this section later, on actual Defensive Tactics, but all these mutual support maneuvers are ramifications of the one basic situation. The position discussed here is one adopted generally on the way home and before contact is made with the enemy. The position was assumed because the flight leader knew beforehand he had no offensive capability. Then the flight is on the offensive but out-maneuvered, it will be necessary to use almost the same defensive tactics. The principles are identical but the course of events leading up to their use will differ. On the offense, the wingman could be flying in the fighting position, in close, until the last moment. Going on the defensive he would slide out just before an attacker is close enough to fire, causing him to select *one* for attack, leaving one free. The free one comes back in on the attacker. This is merely practical application of the basic defensive set-up.

Remember the basic defensive set-up as described below would be used when aircraft are too low on fuel to fight, have no ammunition, or are damaged to the extent they have lost *all* their offensive capability.

1. Move your wingman well forward, nearly line abreast.

2. Wingman goes wide when being attacked, so as to present two targets.

3. The aircraft attacked turns away from the other when possible and must then concentrate on the attacker, taking every opportunity to return to homeward heading.

4. The aircraft not attacked watches attacker and turns so as to position himself at 6 o'clock to the attacker, thus driving him off or shooting him down.

5. If the attack is not pressed, aircraft involved reverse and head for home.

6. If attack is pressed, everything possible should be done by the free aircraft, regarding mutual support turns, to break up the attack.

7. The aircraft attacked breaks hard into the attack, causing attacker to over-shoot; if he does not over-shoot, there is no choice but to use the diving spiral maneuver hoping the other aircraft will help out. Watch yourself for you may need the "Last Ditch Maneuver" on this one.

CALLING BREAKS

While using the defensive set-up described here, the necessity to "break" one way or the other will present itself early as a certain amount of a problem. If everyone of your team uses this

(Continued on Page 20)

(Continued from Page 17)
term under the same circumstances, it will certainly reduce the trouble you have.

"Break" is an emergency call, and the word "break", when used properly, is an admission that someone has failed to do his job of looking around. In a "break" the two aircraft of an element begin an in-place turn in the direction called. It should be called only when enemy aircraft are discovered in range and about to fire (2,500' range or less). **(NOTE: With today's weapons systems a break or hard turn call may be necessary much earlier than 2500 feet to defeat the attack or weapon.)** If the wingman is holding anywhere near the correct *fighting* position, he will find it is very easy to fly the leader's wing even when turned into. If he is too far forward and must turn immediately (as would be the case if you were already being fired at), then the leader will see this and should continue around about 130 degrees at least until the wingman calls that he has the leader in sight again. He flies wing again immediately upon picking up the leader. A reverse maneuver after a break into a wingman is risky; the wingman can't see the leader the first 90 degrees or so if he was flying too far forward at the time, and you can't be sure he'll pick up a radio call to reverse. All these cases discussed cover about 1% of all turns into enemy aircraft. The other 99% of the time you are expected to be looking around properly, in which case a simple call such as, "Let's go hard right, Baker lead, two coming in from five o'clock high", will do nicely. The wingman, then, will be flying the leader's wing around a turn into the enemy aircraft.

REVERSING A TURN

We mentioned that a reverse during a "break" was risky; it is in that case but, if used properly, reversing a turn is the quickest way to get from the defense to the offense. It can also be the quickest way to get shot down if used at the wrong time. Never try to reverse your turn if you have an aircraft behind you *at your airspeed.* Lateral separation is the determining factor in using this maneuver and can be recognized easily by merely tightening up your turn into the attack and watching closely the attacking aircraft. If he slides outside your radius of turn, reverse into him for he has created that lateral separation which you are always seeking in any defensive maneuver. Your best chance of getting this lateral separation will usually come when the attacker is faster than you or coming in on you with a high angle off. Keep turning into him until he slides past you to the rear, then reverse. From then on, as he slides out in front, he is on the defensive and you are on the offensive. **(NOTE: "It 'ain't' necessarily so..")** More than one turn reversal constitutes a scissor maneuver.

THE SCISSOR MANEUVER

This scissor maneuver is one maneuver with which you must become familiar. Anytime two aggressive pilots meet in comparable fighters, the eventual result will be a series of maneuvering turns for advantage. These turns kill airspeed, and the pilot who is most familiar with the low speed maximum performance of his aircraft will come out the winner. These fights that wind up at low speeds usually do so in what we call a scissors. The maneuver, if properly executed, is probably the fastest known method of getting from the depths of despair to the victory roll.

As you are being attacked, you turn into your attacker until he can no longer stay in your radius of turn. When this happens, you will see him begin drifting to the rear of you quite rapidly. The more rapidly he approaches your six o'clock position, the earlier you can chance a turn reversal. You know he has more airspeed or he wouldn't be there, so as he drifts through the five to six o'clock position, pull up and reverse your turn. If he is closing slowly, reduce throttle and use speed brakes as you reverse. If he has a rapid rate of closure, reducing throttle and using speed brakes will not be necessary. After you reverse, you will observe him still turning hard toward you - canopy to canopy.

From this point on, the two of you will conduct a series of turn reversals, each pilot endeavoring to get rid of his airspeed by pulling up, using speed brakes, maybe even using a small degree of flaps. The attacker, if fool enough to go this far, after one or two more reversals ends up sliding in front of the one he was attacking, or reducing throttle. This series of closing-in, continuous turn reversals is called a scissor maneuver.

Obviously, the pilot who is able to decrease airspeed the quickest once these reversals start, will end up in the firing position on his opponent. The trick, if you are being attacked, is to be able to recognize the instant to reverse. If you are the attacker, you must realize a smart fighter pilot is going to have you in serious trouble very quickly unless you pull up, trading airspeed for altitude, the instant you are unable to track him with your sight. When attacking, don't have too much overtaking speed. It merely cuts down firing time, makes tracking more difficult and often can be the difference between a kill and a damage.

If you have an element to stay high and fast to cover you, your best bet, if you know your aircraft, is to use a pinch of speed brakes and attempt to get at six o'clock very close to his airspeed. If he out turns you, slide high but in his orbit gradually cutting down airspeed until you can be direct-

ly at six o'clock and at his airspeed. This procedure must be played by ear. What gave a kill yesterday may make a POW today. You are burning the candle at both ends if you slow down without your element there to cover you; this is especially true if very many enemy aircraft are being sighted on that mission.

Wingman must be indoctrinated to the scissor so as to be able to fly wing properly, staying behind the leader, thus allowing him complete freedom of action. If your wingman can't stay with you during a scissor, he has more practicing to do before you can expect good results against an aggressive enemy.

DIVING SPIRAL

If you end up in front after one of these scissor maneuvers, your only salvation may lie in how quickly you get your nose down and get into this diving spiral. Maybe you can get some airspeed before you get hit too badly. Become familiar with this maneuver for it is useful regardless of type of type of aircraft being flown. Your best protector with an aircraft at six o'clock is "G" force. You need speed to get G's - thus, the diving spiral. Keep the G's on and keep the nose down so you can keep enough airspeed to make it rough for the shooter. Try to watch the aircraft behind you. If you can see the belly of his aircraft, he's beginning to pull lead and may be about to fire. Tighten up your turn immediately.

THE LAST DITCH MANEUVER

When the diving spiral won't do the trick, your last hope is in the "last ditch" maneuver. A good wingman should have one good "last ditch" maneuver and practice it frequently. Keep in mind, though, that it is a "last ditch" maneuver and not one to be used merely because enemy aircraft are somewhere behind you. This maneuver would be used only if an enemy aircraft were at six o'clock to you, in range and firing, or about to fire, and at your airspeed. If he is faster or slower than you, there are obviously other more productive methods of dislodging him from the six o'clock position. If, however, through your own carelessness or inability, you find yourself with an aggressive enemy fighter pilot at six o'clock and *close to your airspeed,* you are going to have a good one to tell the boys at the bar that night - if you get back. Whether or not you do get back will depend a great deal on how much thought and practice you have put on this last ditch maneuver and also, on how well you fight off the tendency to panic in such a situation. There may be other ways to dislodge an aircraft from the six o'clock position, but the one described here is the best for our money once he is in range and at your airspeed at six o'clock. **(NOTE: MIG 17's will love you if you use this maneuver against them in an F-4.)**

1. Get your aircraft into a 5 or 6 G turn as quickly as possible.

2. As your airspeed drops off, lower the nose so you can continue to pull the high G's.

3. Five or ten thousand feet of this may be enough to lose a pilot who is unsure of himself or half-hearted in his attempt to destroy your aircraft. If he is a good, aggressive pilot, however, the fight has just begun.

4. At about 15,000' you are going to have to decide on a "do or die" effort to shake him. Increase your G forces to 6 or 7 G's, if you can, and slowly reduce throttle to idle.

5. As you reach idle, throw out speed brakes and reverse your direction of turn without easing up on the G forces. (You can do this easily merely by pulling the nose up and over into a high G barrel roll opposite your original direction of turn.)

6. After about 30 degrees of this turn, reverse your turn again. This should not prove too hazardous, for by now you should have your attacker in a full scissor maneuver.

7. As he sees your speed brakes go out, he probably will instinctively throw his out, but he has not yet noticed the decreased throttle setting. Even a good pilot usually will not recognize the initial decrease in throttle because the increase in G forces keeps the two aircraft about the same distance apart. By doing this, you have created the one thing always sought by the defender in any dogfight - lateral separation.

8. After your first turn reversal just play the situation by ear. Keep turning into him and you will find his slightly excessive airspeed will carry him out in front of you. As this happens, he will be forced to break out into some maneuver of his own.

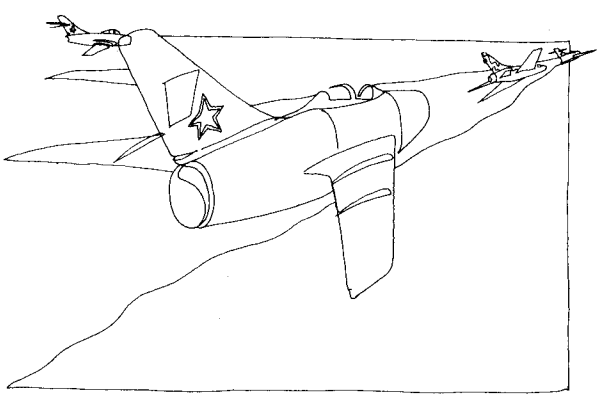
9. Speed brakes "in" and throttle forward immediately as he slides by and you will find yourself in perfect offensive position for a kill.

10. If, for any reason, you don't manage to scissor him through the use of this maneuver, and end up still in front with speed brakes out and throttle back, the pilot behind you will solve any other problems you might have.

MINIMUM FUEL RETURNS

Speaking of unpleasant situations, you can't always tell when you will be engaged with the

enemy. If he chooses to engage you after you have just enough fuel to get home, you may need some special technique to get home with the small amount of fuel you have remaining. If you can get yourself to within 100 miles of the base with 40,000' altitude, you have a couple of alternatives. It will take you about 300 pounds to get back if you will retard throttle to idle and glide at 250 knots. This will get you over the runway with about six or seven thousand feet (depending on winds) from which point you can make one big wide 360 degree pattern. If you have less than 300 pounds when 100 miles out at 40,000', shut the engine off and glide at 180 knots. **(NOTE: Shutting down engines in today's fighter aircraft (i.e. the F-4 is not advisable. These fuel minimums do not apply.)** (When climbing, your fuel gauge will probably read lower than actual, so don't panic and shut-off early.) You can still hit the key point over the end of the runway with 6,000 or 7,000' if the winds are right. Start the same big, wide 360 degree pattern, dropping gear and flaps as you start the 360 degree turn over the landing runway. On downwind, attempt an airstart (ignition boost on and throttle cracked to maintain 500 degrees tail pipe temperature). If it fires up, widen base leg and use what throttle is necessary to make a successful power-on landing. If it doesn't fire up the first time, abandon all thought of an airstart and concentrate on making your dead stick landing. If you only have a little fuel left, don't waste it gliding, keep it for the traffic pattern. Don't be afraid to cut it off. Nine times out of ten you will get a normal airstart on downwind leg.



DEFENSIVE TACTICS (SPECIFIC)

Now let's get into some standard actions that you'll be expected to perform from time to time. Knowledge dispels fear - know your job and coolly do what is required according to the circumstances.

1. ONE ATTACKED BY TWO: Don't panic no matter how many aircraft are attacking. Panic is your most formidable enemy. As the two come in on you, go to 100% and nose down to pick up a high Mach. **(NOTE: In today's missile environment you need to keep angle off so you can see a missile launch. Also, with a high wing loaded versus low wing loaded aircraft, trying to out turn your adversary, chopping power and using speed brakes cannot be considered reasonable elements of strategy.)** As they near the 3,500' - 2,500' range (range actually should depend on what kind of ammo is being fired at you), break sharply into the attack and make sure you offer no less than a 50° or 60° angle off shot at five to six G's. At this stage of the attack you should see both leader and wingman sliding to the outside of the turn or, if they choose to YO YO, climbing steeply to your rear. Your best move, if they are attempting to turn with you, is to wait until they slide through the trail position then reverse, possibly chopping power and using speed brakes, if required, to get to the rear of the enemy number two man. Base all your maneuvers on the wingman as long as he is still attempting to fly wing. Don't get yourself sandwiched in between the two of them accidentally. If they decide to YO YO on you and pull up as you begin out turning them, put your aircraft into a diving turn and keep going away from them. With them going up and you going down initially, you'll probably get enough of a range spread to keep you out of trouble. *Don't try to pull up with them if they quit tracking and begin an early pullup.* You haven't as much airspeed and consequently will end up either low or stalled out. Either way you are in worse shape than if you break away and down and do barrel rolls toward the ground while you are picking up speed.

2. ONE ATTACKED BY FOUR: You have a real problem if the four have any idea about what they are doing. Your procedure is to turn into all attacks and to be sure you don't get cocky and try a reverse with the other element spaced about 10 seconds behind. Keep both pairs in sight at all times. You'll notice after the first attack or two that the attacking elements are not evenly spaced. Watch for this and, just after turning into the last element, continue your turn and go away at 180° and with all the airspeed you can pick up. Get your nose down quickly, for the gap you are trying to create will depend on your picking up maximum speed as quickly as possible. Each time you turn into an attacker, lower the nose to keep airspeed up. This will keep you ready for an immediate reversal if you should need it. Remember, airspeed is your salvation. Keep your attackers at high angles off, and *DON'T PANIC*. Watch for your chance to break away and down, then get out. Come back tomorrow with a full flight.

3. TWO ATTACKED BY ONE: If you have a good wingman, this should prove no more difficult than

if you were a single. Turn into the attack and attempt to swing him outside your turn. Reverse and scissor until you get him to break away and down. If he is extremely sharp and gets in behind you at six o'clock and at your airspeed, during the initial maneuvering phase, spread out and force him to pick one of you or the other. This should be done when he reaches the 2,500' - 2,000' range. The free pilot helps the other one. A tip for the pilot who is attacked - forget about everything but shaking the man behind you. Just hope for the other member of the element's help, but make no turns to get it. Keep your eye on that attacker; keep him at a high angle off, and keep 5 or 6 G's on the aircraft. Be prepared, if he follows you all the way down, to use your "last ditch" maneuver.

If the leader and the attacker become entangled in a low speed scissor maneuver, the wingman may find the opportunity to slide out away from them both. If so, he should do it, then get his airspeed up and circle the fight, ready to jump the enemy aircraft in case he should get an advantage on the leader.

4. TWO ATTACKED BY TWO: Turn into the attackers when they are just outside firing range (2,500' - 3,500'). Fight as though you were a single until you either get an advantage or until they get one on you. Handle the reverse the same as in other cases; if they are down on your level trying to turn, reverse and scissor them as they slide past the trail position. If they pull up early, as they do in most cases, they probably won't drift out of your radius of turn far enough to make a reverse anything but dangerous. As they go up, you do down-barrel rolls going down to be sure a lucky hit doesn't get you or your wingman before you can get some distance between yourself and the attackers. If the two of them do make the turn and you end up with them at your airspeed at six o' clock, spread out and see what they do. If they stay together and attack one of you, the other can swing back in, sandwiching them between you and your wingman. The lead (or one taken) again is on on his own while the free one does his best to help. If, as you spread out, one of them slides out so each of you has an attacker, you are in a bad way. This situation calls for about the only advisable intentional split of element. Each of you must forget the other and do whatever is necessary to shake your attacker. If one gets free, naturally, attempt to help the other. This one's a rough go.

5. TWO ATTACKED BY FOUR: Turn into the attacking lead element keeping them, as in other attacks, at a high angle off. Even if they stay low and try to turn with you, be careful about reversing unless you are sure the second element is still high above. Frequently, the second element will come in at about a seven-second interval, in which case a reverse on the lead element could be disastrous. Keep your airpseed up by diving as you turn into each attack and attempt to catch one element in a reverse when the other is too poorly positioned to help out. If they work their way behind you at your airspeed, you may have to try to spread out, hoping that the attacking element will remain intact. If so, the free pilot helps the other. Here he must be particularly careful, for there is the other element to reckon with. In addition to the attackers, he is fighting at close range. He must know the whereabouts of the extra element. This is a good situation out of which to break, if possible - especially if attackers know what they are doing. Watch for your chance - it comes with unequal spacing between attacks. Turn into the attack and leave away and down at 180 degrees to your attacker.

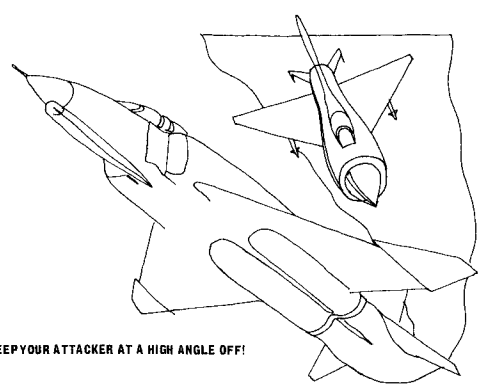
6. FOUR ATTACKED BY ONE: By now we begin to see the patterns of defense repeat themselves. The element attacked stays wide and at the last moment breaks away from the other element. The free element plays his supporting action, so as to sandwich the attacker between elements. This forces a trade of aircraft or causes attacker to reverse into the supporting element, thus freeing the one originally attacked. Be careful not to commit yourself too quickly or too completely. Don't break too early and find you have allowed the attacker to switch targets. If the top friendly element is attacked, he will have better luck breaking down and away from the lead friendly element, calling him and advising him of this as he does it. The leader can delay momentarily, then wheel about, sandwiching the attacker in between. If the lead friendly element should arrive for support at such a time as to parry the attack at a range of 2,000 or 3,000 feet. If an advantage is gained on the attacker, the second friendly element should continue to press the attack even if it means separating from the lead element. If it looks questionable, the second element repositions itself as cover for the lead element.

7. FOUR ATTACKED BY TWO: The defense here is exactly as it would be if attacked by a single. If the attacker's wingman is separated for any reason, the free friendly element should attempt to engage him immediately, keeping him from lucking into a position of advantage as the friendly element maneuvers with the leader of the attack.

8. FOUR ATTACKED BY FOUR: This represents quite a problem for both attacker and the flight being attacked. Assuming the attack is on the high element and is discovered normally, the friendly second element should nose down to pick up speed, calling out the bandits to the flight leader as he does so. From now on the element merely stays wide and waits for the opportune moment to turn hard into the attack. If the second friendly element has reached a position abreast of the lead

friendly element, he should, if at all possible, turn away from that element as long as doing so does not give the attackers any advantage. If in doubt, however, always turn into the attack. The second element must be very careful not to break too soon for this is exactly what the attacker desires. If the attacker can make the second element (friendly) think he is going to take them to the deck, and make them dive away, he will switch his attack to the lead element who will then have no chance for help. Should the attack be on the high element and from the side the lead element is on, an early turn into the attack is suggested so that the mutual support can be accomplished easier. If the attack is from the outside of the formation and a turn away from the lead element is assured, delay a little, dropping down before wheeling into the attack. With this procedure it will be a simple matter for the lead element to sandwich the attacker in between. At this stage the lead friendly element must watch carefully the second enemy element. They may commit themselves with a 7- or 10-second interval behind the lead element or they may still be high above waiting for an opportune time to drop in at 6 o'clock to another element or single aircraft. Either way, much emphasis must be placed on looking around, for the attackers will have the trump card.

If the initial attack is on the lead element, the second element should come down immediately and attempt to parry the attack. If the attack is broken up, the second friendly element should continue to follow up any advantages gained by pressing home the attack on the first enemy element. Look around! Don't let the other element surprise you. A call will be necessary to advise the lead element that they are clear at present but on their own from this time on. The fight must be "played by ear" from this point, utilizing the basic principles of offense or defense as the situation may dictate.



KEEP YOUR ATTACKER AT A HIGH ANGLE OFF!

BASIC PRINCIPLES OF DEFENSE

1. If you slow down, have an element high and fast for support.

2. Except at extreme ranges, always turn into the attack. **(NOTE: Against Mig 17's it's better to extend.)**

3. If there are enemy aircraft anywhere in the area, get rid of external tanks and get your Mach up. It's too late after you spot him.

4. Keep your attacker at a high angle off.

5. Keep airspeeds up when patrolling.

6. Don't ever reverse a turn unless you have your attacker sliding to the outside of the radius of your turn.

7. If you have a "hung" external tank, leave the combat area.

8. If you lose your wingman, both of you should leave the combat area.

9. Know the low speed characteristics of your aircraft. If you are fighting aggressive pilots, you'll need all the know-how you can lay your hands on.

10. Have a "last ditch" maneuver and practice it.

11. Keep a close check on your fuel.

12. "Best defense is a good offense", is good most of the time, but know your defensive tactics.

13. Don't play Russian Roulette! When you're told to "Break" - do it!

14. Avoid staring at contrails or the only aircraft in sight. There are a dozen around for every one you can see.

15. Watch the sun - a well-planned attack will come out of the sun when possible.

16. The object of any mutual support maneuver is to sandwich the attacker in between the defending aircraft.

17. In any dogfight, the objective for the defender should be lateral separation. When this is achieved, a reverse and a series of scissors will, if properly executed, put your attacker out in front. The rest is up to you. **(NOTE: A scissors maneuver in the F-4 against Mig 17, 19, or 21 aircraft is not advisable.)**

18. Place yourself in your attacker's shoes. How would you like to find an enemy flight positioned? Be smart and avoid this formation for your flight.

19. Don't panic; panic is your most formidable enemy!

conclusion:

Subjects Related To The Tactical Problem

Most things we have discussed thus far have been directly connected with tactics or flying itself. There are quite a few things, however, in a Combat Fighter Organization that affect the mettle of your unit indirectly and, although equally important, don't lend themselves too readily for discussion in a presentation such as this. Here are a few that we feel are of such import as to be worthy of discussion. Let's start with your most basic problem, Employment of Fighters. This may be decided for you at Higher Headquarters but then again your opinions might help. What was done in Korea is not the only answer but it supplies background at least for study of success or failure according to the conditions which existed at that time.

EMPLOYMENT OF FIGHTERS

There were two general methods used to employ jet air-to-air fighters on Fighter Sweep Missions in Korea:

1. Mass formations.

2. Area saturation.

Each method has advantages and disadvantages but either may be needed from one day to the next depending on several factors.

1. Formation the enemy is using.

2. Size of the area you are attempting to control.

3. Performance characteristics of enemy aircraft to be encountered.

4. Quality of enemy pilots.

5. Mission.

6. Supply support available.

7. Evaluation of past tactics in that area.

The Area Saturation Method was used very effectively in Korea because the enemy here in most cases had to be sought out. A successful mission to the enemy was to penetrate fifty or sixty miles into North Korea and then turn and flee for the border. To arrive safely was, apparently, the objective - not to destroy United Nations aircraft.

In order to trap the enemy aircraft that were penetrating east and south of the Yalu River boundary, our fighters were used in elements of two at varied altitudes in predesignated areas. Our aircraft maintained their vigil until a call was received that Migs were coming across the river. At this time, those fighters that could converge on the "hot" area allowing us to mass our strength and fight with twice as many independently operating flights (although of two ships instead of four). For the particular situation in Korea, the area saturation proved more effective, for the quality of enemy pilots was generally low; the area we were attempting to control was relatively small; and the aircraft involved were close enough in performance to allow pilot training and individual aggressiveness to be the deciding factors.

Mass formations were conducted by massing two or three squadrons all under one Group Leader; in general, they:

1. Required too much formation flying. Potential leaders were using valuable time flying formation that could have been devoted to looking offensively.

2. Lost the value of surprise. A large formation can be tracked easily by radar and the pilots usually found they were being attacked rather than being the attackers. This can be expected when encountering enemy aircraft with better high altitude performance characteristics.

3. Were not able to remain long enough in the combat area. Too much fuel wasted joining up, flying formation, etc.

4. Did not allow our pilots to properly use the "aggressiveness" advantage we enjoyed.

5. Allowed the Communist radar installation to track us around until it was time to leave the area, at which time they would commit their fighters.

It should be remembered that these conditions existed under the special circumstances in Korea. Even there, we could have been forced into an overnight change by some radical change in tactics by the enemy.

SELECTION OF FLIGHT AND ELEMENT LEADERS IN COMBAT

This seems only remotely connected to the overall problem, but is actually more important to the average squadron in combat than the type tactics

they decide to use. Our personal opinion on the selection of flight and element leaders is this: When a man's life depends on the brand of leadership displayed in the combat area, he has a right to expect his commander to furnish him with the best leaders available in the organization. As a commander, unless you are extremely fortunate, you can't do this and still have all your personnel lined up by date of rank. Here are a few guides recommended for use in a fighter squadron already operating in combat:

1. Assuming he meets a minimum standard of experience and leadership, give the first opportunity to the ranking man.

2. If you must choose between leadership ability and date of rank, or leadership ability and flying time, by all means select the man who has demonstrated the leadership ability.

3. Advise every man who gets a new job that it is a temporary or trial selection; then let him tell you by his actions whether or not the selection is temporary (three weeks to a month should be plenty of time for a man to show his true colors).

4. Give a man who is not measuring up ample warning, but be honest enough with the rest of your squadron to remove him if he does not produce the desired result in a reasonable length of time.

5. For determining whether he is measuring up, judge him on these things in this order:

   a. Leadership ability and results in combat.

   b. Aggressiveness.

   c. Flying ability.

   d. Cooperation.

   e. Administrative ability.

All these things obviously would produce an ideal officer in combat. You may not get them all in one man; but if you observe your pilots closely, and utilize the quality traits you observe, you'll have a head start on most other organizations when considering combat results, morale, and operating efficiency.

Another thing along this line that is worthy of mention. You may as well face the fact that all of your people will not be as aggressive as you would like. You can count on about three, if you are fortunate, of your pilots in the squadron to possess those things necessary to be exceptional leaders and produce more than an occasional kill or two. There will be a secondary group, both wingmen and element leaders, who want to do the job but don't have the experience yet to do it.

You will be *blessed* with a third group, relatively few in number, who will not do the job regardless of the instruction offered them. These, unfortunately, are frequently highly experienced personnel and have the capacity to poison your young pilots just beginning their tour of combat. These "pseudo leaders" are the people you must weed out. To "tide" these along is the greatest mistake a commander can make. They must be dealt with just like any other individual doing a below average job back home. Warn them, remove them, and get a man who wants to do the job. You owe that much to your people who are willing to fight.

VOICE PROCEDURE-RADIO DISCIPLINE

Proper voice technique is mandatory and a very definite part of the overall training. Obviously, a wingman who sees what he should but is too excited to get the information quickly and clearly to his flight leader is of questionable value. Wingmen should be trained to put out a call to their leaders about every 20 seconds once enemy aircraft are sighted and it is evident that the leader's attention is required offensively. Wingmen must definitely be able to recognize and call out the proper time to slide wide when attacking aircraft have worked their way to the six o'clock position and are almost in firing range.

Here is another little thing that will make your flight more effective. Some method should be devised to indicate to other members of the flight that the leader has his eye on a possible enemy aircraft. The term "padlock" proved adequate in Korea and indicated to other flight members that the leader was glued on an aircraft and wasn't looking away until he was close enough to identify or attack. It meant that other members had to redouble their efforts in looking around when offensive action was imminent. This is necessary, for even one look away is enough to lose a possible kill.

Here's one more: Get your flight in the habit of flying formation without radio calls of any kind (turns included) except for calling in bogies. The radio must be held clear in order that those who are in actual contact with the enemy may properly coordinate their actions.

SPEED BRAKE UTILIZATION

Here's a subject that will always stir up an argument. We feel that the use of speed brakes in combat is a mandatory requirement. During an attack, airspeeds generally have to be cut down to within 150 or 200 knots of the aircraft being attacked, if anything other than a few sporadic hits are to be the result. An element slowing down to any extent should have another element high and fast for top cover. Speed brakes may be used anytime the immediate result could be a kill. Never use them to tighten up your turn unless, as you see them, you are sliding high and to the rear of the aircraft being attacked. Practice coming up behind

another aircraft that is straight and level. Use your speed brakes in increments (out and back to neutral immediately, thus obtaining quarter or half brakes as desired). To use them only full out or full in is to waste what can be a valuable asset.

THE MACH .9 SLAT

Speaking of ways to get more performance from your aircraft, here is something that gives the present F-86F a real fact-lifting - the Mach .9 slat. In flying a comparison between the hard wing F-86F and the F with Mach .9 slat, some interesting things turned up. At 40,000 and .9 Mach the slat 86 turned about 180 degrees before the hard wing "F" turned 90 degrees. At lower altitudes, with a constant "G" and similar power, the slat "F" out accelerated the hard wing to the extent that it made four 360° turns while the hard wing "F" was making three. Neither cruising nor climbing speeds were affected. The feeling when pacing the slat "F" with a hard wing "F", was similar at times to that of following a fighter with a poor man's afterburner. You will be out-turned at high airspeeds, out-zoomed, and out-accelerated. Low speed handling characteristics are excellent; at traffic pattern airspeeds the control is similar to that of the old automatic slat F-86A.

If all our F-86F's could be equipped with this slat, their performance would be enhanced considerably. In addition to this, a big portion of the program of retrofitting the aircraft could be paid for by those aircraft saved in the traffic pattern during training alone.

Here's something that gives safety and performance both. We should all be able to agree on that. **(NOTE: .9 slat does not apply to the F-4.)**

GUNS AND GUNSIGHTS

We have been discussing some of your major problems of maneuverability. This will constitute about 85% of the job of destroying another aircraft in the air, but let's look at the other very important 15%. When you have maneuvered into a position where you can fire, it's a heartbreaker to come back without a kill. A few things to help you avoid having this happen to you are:

1. Know your harmonization procedures and be present when they harmonize your aircraft.

2. Know your firing techniques. Be able to do the job with radar, pegged range, *and* the fixed sight.

3. Fire short bursts until you find your aiming point.

4. Learn to estimate range.

5. Don't fire when you should still be maneuvering.

6. Know your gunsight like the back of your hand. If you can't even tell when the sight is operating improperly, you can't expect luck to carry you very far. Here are the bare minimums every pilot should know about the A-4 Radar Sight (F-86, F-84, F-100), outlined as a pre-firing check for your convenience.

Part I

1. Turn on switch to "sight and camera" and leave for three minutes.

2. When radar lock-on light is out and you are high enough to be in smooth air, slide out to the side of your leader and uncage sight. These things should happen:

a. Sight should stabilize immediately in center of windshield.

b. Range dial should read 1200 feet plus or minus 100 feet (approximately).

c. Lock on light should be off.

3. Pump stick to see that pipper moves up and down.

4. Fishtail lightly to see that pipper moves left and right.

Part II

1. Move spanner dial to wing span of aircraft you are tracking.

2. Slice into trail and these things should happen.

a. Lock-on light should come on.

b. Range window should leave 1200' and now indicate distance target is in front. (For best results try this check at 1500 to 2000 feet.)

c. Diamonds should bracket or span the wing tips of aircraft in front of you.

Part III

1. Apply power and move in on aircraft in front of you.

2. As you close in, these things should happen:

a. Range dial should smoothly indicate decreasing range.

b. Diamonds should spread out smoothly and stay on wing tips of aircraft in front of you.

c. Sight will break lock about 900 feet and return to its initial condition when first uncaged (i.e., no lock-on, range dial 1200 feet plus or minus 100 feet).

Part IV

1. If circumstances allow, track aircraft in front in a 2 or 3 "G" turn; write up any erratic actions of the pipper or diamonds.

2. Don't just tell the sight man - write it up.

3. In combat fire a sighter burst. This will tell you your guns will fire, and if using tracer, it will give you a harmonization check.

4. Have tracer loaded - one for every five rounds if you can get it. This brings up an interesting subject about which there has been considerable controversy.

TRACER AMMUNITION

Much has been said in regard to the advantages and disadvantages of using tracer ammunition in combat. There are several ways tracer can be of definite aid to a fighter pilot.

1. By loading one round of tracer in every five rounds, a sighter burst will give you a check on your gun operation and gun harmonization.

2. By loading the last twenty-five or fifty rounds using only tracer, the pilot can be warned that he is about to expend the last of his ammo load.

3. When an enemy aircraft is hit but still getting away or is drastically out of range, tracer fired at the right time can make him break one way or the other, at which time you can cut him off in the turn and finish the job.

4. When firing with tracer under "G" load, the pilot can check on his lead and see immediately if he is using too much rudder. He can pick up any type sight difficulty quickly.

A disadvantage or two of tracer ammo is:

1. It has replaced an AP or API round and thus slightly cut down your effectiveness.

2. It is frequently distracting to the pilot and takes his attention from the pipper momentarily.

3. In certain circumstances it could warn the enemy of your presence.

4. Requires more work for the armorers.

Taking all advantages and disadvantages into consideration, when firing 50 caliber ammo, we feel the tracer ammo is definitely worthwhile and should be used if available.

Now this brings up the much discussed subject of whether 50 caliber is what we really want in a fighter aircraft.

50 CALIBER VS 20 MM

Much has been said and many heated arguments have been had on this subject. Without regard to the type ammo used, it should be safe enough to assume that what we like about 50 caliber ammo is the shotgun effect of its high rate of fire. If this same effect can be had with a larger and more destructive missile, our opinion is, "Let's have it." A few other things should be considered, however, before we go off the deep end. About 7 to 10 seconds of continuous fire should be a minimum; guns should have the capability of being fired separately if the pilot so desires in flight. No sense in using all guns; for instance, when you are at 500' with 20 mm and right in the saddle at six o'clock.

Many pilots have commented that 50 caliber ammo wasn't too effective beyond 2200-2500 feet. This is true, but we feel our trouble is not entirely in the guns, but to a greater extent in the aircraft. No good fighter pilot is going to fire at those ranges unless the aircraft he is flying lacks the performance to get him closer. This business of firing at greater ranges is a popular misconception in regard to Korea. Contrary to much that has been published, the fighter pilots who shot down more than an occasional Mig or two, got them around 400-1200 feet just like they did in Europe and the Southwest Pacific during World War II. Two things made pilots fire out of range. (1) With jet aircraft the speeds were so great that judgment was poor a good bit of the time (as is evidenced by the few aces compared to the total number who rotated through the Sabre outfits) and (2) even the *1950* Mig-15 enjoyed a 2 - 1 climb advantage over the *present* hard wing F-86F. These two conditions caused a lot of "desperation firing". Why not? You aren't going to get a better shot with him climbing away, and you *might* actually hit him. It's better than coming home with all your ammo - at least it's a chance. But, make no mistake about this - the pilots still wanted to get exactly where they did in World War II - six o'clock at 1200 feet or less. It was only lack of aircraft performance and poor judgment that forced him to do otherwise. The answer to this problem is an air superiority fighter built for one specific purpose - to clear the skies of enemy aircraft and with all design directed toward that one goal right from the beginning.

This concludes our reproduction of NO GUTS NO GLORY. The original text has been tampered with very little. Many "specifics" discussed in the foregoing are no longer valid. Many of the "general" areas are still valid. As aircraft change and people change, tactics and capabilities also change. Yet the goal (a kill) never changes. As a result, we must "relearn" the lessons of the past, sharpen our thinking in the future, and expand our knowledge in the present. Hopefully this look at the '50's (F-86 versus Mig 15) will get us all digging into the real world of the '70's (F-4 versus Mig 17, 19 and 21).